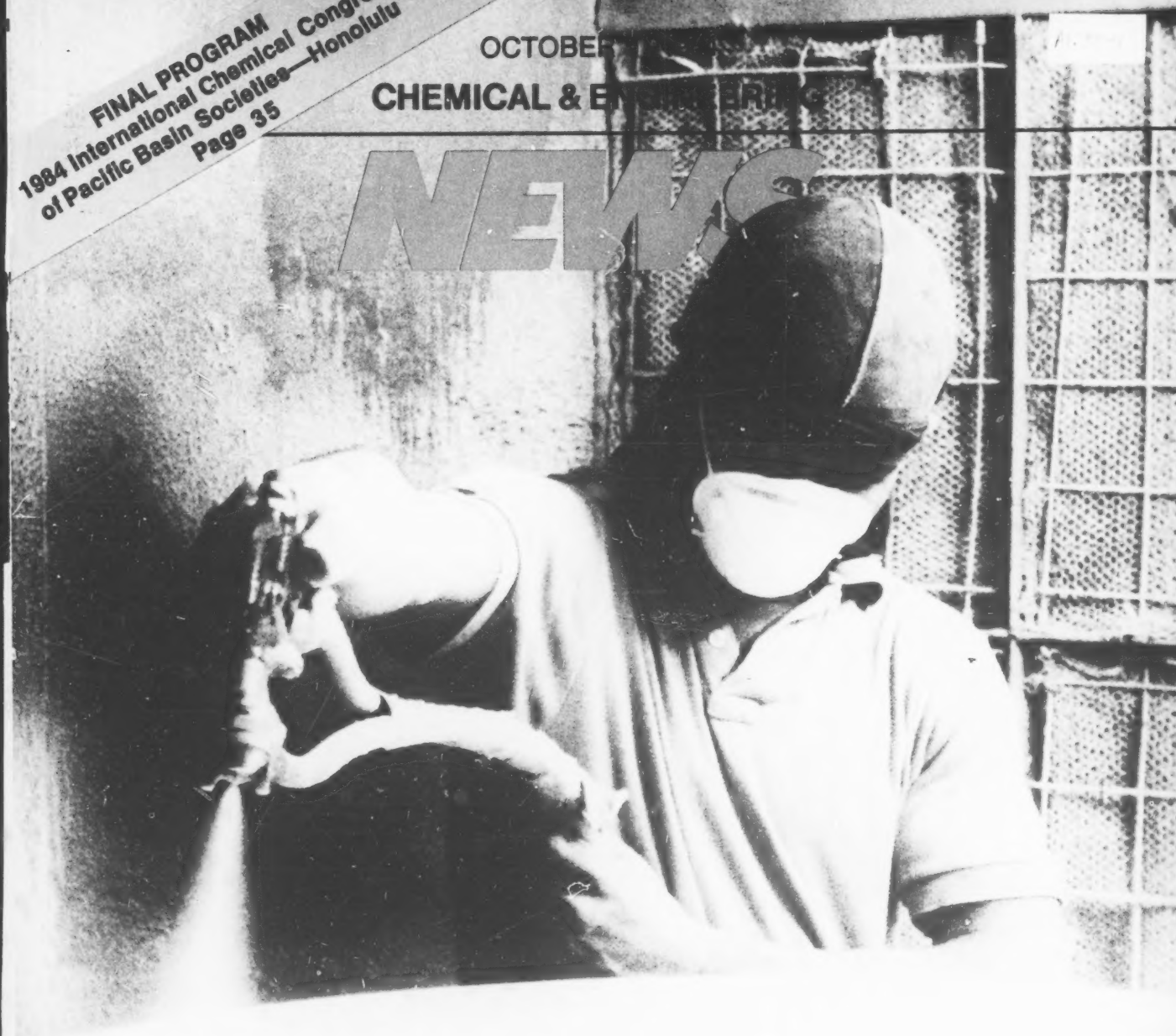
OCTOBER
CHEMICAL & E[illegible]
NEWS

FINAL PROGRAM
1984 International Chemical Congress
of Pacific Basin Societies—Honolulu
Page 35



Paint Industry Heads for Record Year

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OCTOBER 1, 1984

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■ **Judge approves settlement of agent orange suit between Vietnam veterans and seven chemical firms.** **Page 4**

■ **GAO study of conflicting NAS reports on diet and health says that both followed good scientific practices.** **Page 5**

■ **Signal UOP will expand its Des Plaines research center, physically and in areas of research.** **Page 5**

■ **Gene from bacterium found in raw sewage produces enzyme that digests lignin.** **Page 5**

■ **Erosion is depleting the world's topsoil at a rate of 25.4 billion tons a year, study finds.** **Page 6**

■ **Antiapartheid terrorists bomb Union Carbide's Tarrytown technical center.** **Page 6**

Cover: Workman at Woodlee Furniture Corp., Paterson, N.J., sprays table with high-solids, low-fume unsaturated polyester finish made by Mobay

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Experts in dioxin research identify areas where data are scarce, prioritize research needs; magnesium monoperoxyphthalate's crystal structure gives clues to compound's unusual stability. **Page 18**

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Final Program

Complete technical program, preregistration data for International Chemical Congress of Pacific Basin Societies. **Page 35**

Product Report

The paint and coatings industry is enjoying record-setting growth in shipment volume that is continuing recovery begun last year. **Page 51**

Recession's Harm to Chemical Employment Detailed by New Data

Hardest hit sectors were plastics, ag chemicals, and paint; some such as drugs weren't affected, according to Labor Department figures

William J. Storck, C&EN New York

The recession is long past and chemical production is once again on the rise, with an accompanying increase in hiring of chemical workers. But how bad the recession actually was for employment in the chemical industry has only recently come to light through just-published data from the Department of Labor.

For instance, in spite of the recession's ending in late 1982 for the general economy and in the second quarter of 1983 for the chemical industry, employment in the chemical industry in 1983 continued lower than it was during the year before. And, although chemical employment began to turn up at about the same time as the chemical economy, the lagging nature of employment—plus the efficiencies put in place by chemical companies during the recession—tended to slow employment growth all during 1983.

Thus, last year, employees for chemicals and allied products totaled about 1.05 million, down 3% from 1982. This follows an equal reduction in 1982 from the year before. Between 1979, the last good year for the chemical industry, and 1983, employment in the chemicals and allied products sector dropped 6%.

Total employment in all U.S. manufacturing industries fared even worse. According to the Labor Department, jobs in all manufacturing fell 2% in 1983 from the previous year to 18.5 million, but 1982 was off 7% from 1981. And the number of employees last year was 12% below the 1979 level.

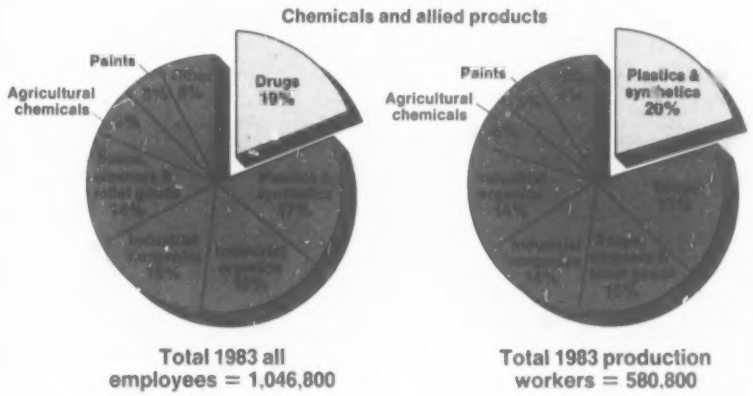
Within the chemical industry itself, production workers fared worse than other employees during the recession. Whereas total chemical employment fell 6% between 1979 and 1983, the number of production jobs dropped 8% to 580,800. Between 1982 and 1983, their drop was the same as that for total chemical employment at 3%, but between 1981 and 1982, production employment fell 5%, compared with the 3% drop for total chemical jobs.

Not all segments of the chemical industry were affected equally by the recession. For two categories—drugs; and soaps, cleaners, and toilet goods—employment actually increased between 1979 and 1983. Drug employment by 1983 totaled 199,700, up 4% from 1979. In the past two years, drug industry employment has remained almost unchanged. For soaps, employment rose 3% in the period to 143,000, despite drops of 1% in each of the past two years.

On the other side of the coin, during the 1979–83 period of economic crunch, employment for plastics, agricultural chemicals, and paint companies was especially hard hit. Employment in the plastics and synthetics sector fell 17% to 176,200. It took big drops in both 1982 and 1983, falling 6% and 5%, respectively. For agricultural chemicals, employment fell 14% between 1979 and 1983 to 60,600 workers. All of this and more came during 1982 and 1983 while the government's payment-in-kind (PIK) crop set-aside program was in place. In each of those years, employment in agricultural chemicals dropped 7%. And paint companies also were pinched badly, with employment falling 13% to 59,700 in 1983 from its 1979 level.

The Labor statistics show that women chemical employment fared

Drugs employs the most chemical industry workers, but plastics has most production workers



Source: Department of Labor

Industrial inorganics suffered greatest drop in employment

Thousands	1983	1982	1979	% change 1982–83	% change 1981–82	% change 1979–83
ALL EMPLOYEES						
Chemicals & allied products	1046.8	1075.1	1109.3	−3%	−3%	−6%
Industrial inorganics	155.1	160.8	162.1	−4	−1	−4
Plastics & synthetics	176.2	184.7	212.2	−5	−6	−17
Drugs	199.7	198.8	192.5	0	0	4
Soaps, cleaners & toilet goods	143.0	143.9	139.5	−1	−1	3
Paints	59.7	59.9	68.6	0	−6	−13
Industrial organics	162.9	170.8	171.4	−5	−4	−5
Agricultural chemicals	60.6	65.3	70.2	−7	−7	−14
Miscellaneous	89.5	91.0	93.0	−2	−4	−4
PRODUCTION WORKERS						
Chemicals & allied products	580.8	598.6	633.3	−3%	−5%	−8%
Industrial inorganics	79.1	85.3	88.0	−8	−3	−10
Plastics & synthetics	114.3	119.3	143.6	−4	−8	−20
Drugs	97.5	98.2	95.5	−1	−1	2
Soaps, cleaners & toilet goods	89.7	90.2	84.3	−1	−2	6
Paints	29.2	28.9	35.5	1	−8	−18
Industrial organics	83.6	85.9	88.8	−3	−4	−6
Agricultural chemicals	36.7	39.6	45.0	−7	−10	−18
Miscellaneous	50.8	50.9	52.5	0	−6	−3
WOMEN EMPLOYEES						
Chemicals & allied products	273.0	279.2	270.7	−2%	−2%	1%
Industrial inorganics	25.7	25.2	23.4	2	3	10
Plastics & synthetics	36.5	40.4	44.6	−10	−6	−18
Drugs	86.1	85.7	79.1	0	0	9
Soaps, cleaners & toilet goods	58.5	58.4	55.9	0	−3	5
Paints	11.4	11.6	12.7	−2	−6	−10
Industrial organics	25.6	27.4	25.2	−7	−1	2
Agricultural chemicals	9.0	10.0	10.0	−10	−6	−10
Miscellaneous	20.1	20.5	19.9	−2	−4	1

better during the 1979–83 period than did chemical industry employment as a whole and better than overall women employment in all manufacturing industries. Whereas total employment in the chemicals and allied products industry fell 6%, the number of women employees rose 1% to 273,000. And in spite of dropping in the past two years, the 2% decline each year for women employees was less than the 3% decline for all chemicals and allied products employees.

The 1% rise in the number of women employed in the chemical industry contrasts with the 8% drop for women employed in all manufacturing. And, although female employment in all manufacturing remained steady in 1982 and 1983, it fell 6% between 1981 and 1982.

According to the Labor Department figures, women comprised about 26% of the workforce in the chemicals and allied products industry last year, up from 24% in 1979 and 23% in 1977. But although this percentage is rising, it still lags considerably the corresponding percentage in all manufacturing industries, where 32% of all employees last year were women.

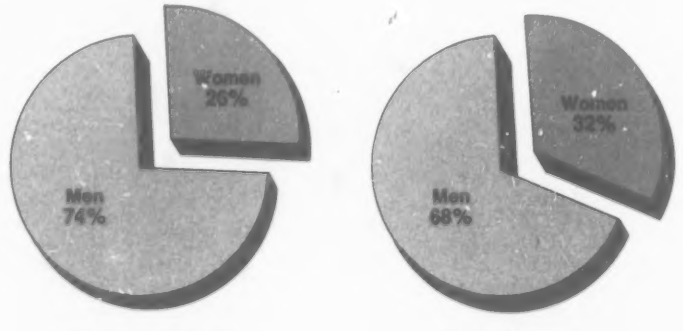
An interesting note derived from the Labor Department figures: By far the largest employer of women in the chemical industry are drug companies, whose 86,000 female employees made up 32% of last year's drug company workforce.

The drugs sector, in fact, employed more chemical workers in 1983 than any other industry sector, with 19% of total chemicals and allied products employees. However, of total production workers, it ranked second, with 17%. Employment breakdown for the plastics and synthetics sector was reversed, ranking second in total employees with 17%, but first in production workers with 20%.

In terms of all employees, industrial organics ranked third with 16% of total chemical industry employees. This was followed by industrial inorganics with 15%, and soaps, cleaners, and toilet goods with 14%. The agricultural chemicals sector employed 6%, and paints 5%, of total employees. Miscellaneous chemical producers employed the remaining 8%.

As before, however, these industry sectors didn't follow the same rankings in terms of percentage of production workers, which tend to show the relative labor intensity of the different chemical lines. For example, the soaps, cleaners, and toilet goods sector employed 15% of total chemical production workers, and industrial inorganics and industrial organics each employed 14%. □

Chemical industry lags all manufacturing in percentage of women employees



Total 1983 chemical industry = 1,046,800

Total 1983 all manufacturing = 18,497,000

Source: Department of Labor

Biotechnology revenues surged in second quarter

The financial statements filed by biotechnology-based companies continue to look less and less like those of development-stage firms. True, the majority of companies are still reporting net losses or, at best, small profits. But undeniable signs of commercial status proliferate in the increasing share of total revenues made up of operating proceeds, especially those from product sales. These indications are more evidence that the many companies using new biotechnology in the fields of health care, agriculture, and chemicals—as well as those which supply them with laboratory reagents and devices—are rapidly growing up.

A group of 15 companies representing a cross section of the biotechnology-based industry recorded a composite 92% increase in total revenues in the second quarter of 1984. At the same time, only six members of the group reported net income. But companies are plowing the bulk of their revenues back into research and development; at this point profit margins are more tokens of appeasement to institutional investors than actual measures of a company's health.

What most biotechnology-based companies are aiming for now is increasing the importance of sales dollars in the revenue mix—assuming they have some products on the market in the first place. Genex, for instance, which reported a 352% second-quarter jump in total revenues—the largest in the 15-company group—points out that product sales accounted for 69% of all revenues during the first half of 1984, compared with less than 1% in the same period in 1983. For Monoclonal Antibodies, whose total revenues for the April-through-June period rose 215%, product sales also played the decisive role—rising to $715,160 from $81,877 in the same period the year before. That was thanks to the introduction of an ovulation prediction kit in May and the fifth of a line of pregnancy test kits in June.

Other firms also boosted their product sales. Centocor, which reported a 69% rise in revenues, also managed a $103,549 profit. "Profitability increased as a result of expanded product sales," comments company president Hubert J. P. Schoemaker. Over the first half, Molecular Genetics, which last year began selling its first product, a monoclonal treatment for calf scours, had product sales of $827,428, or 17% of total revenues. And Ribi ImmunoChem Research recorded a 51% jump in revenues during the second quarter, the result of increasing sales for the company's veterinary antitumor agent.

Not all the best-known biotechnology-based companies have noticeable product sales, however. Biogen, for instance, managed healthy 39% revenue growth without any products. Of its total, 73% came from research and development contract fees, the remainder from interest income. Similarly, Amgen, with a 278% leap in second-quarter revenues, made 47% of that on R&D fees and 50% on interest, leaving just 3% for sales and royalty revenues.

Genentech also derived most of its revenues from contract research. The company, which also had undisclosed revenues on royalties from Eli Lilly for the genetically engineered human insulin Genentech developed and from some product sales for clinical use, is still trying to gain clearance from the Food & Drug Administration for its first major product, human growth hormone. At one time, the company had expected FDA approval before the end of 1983. Now, nearly a year later, a September meeting with FDA resulted in another request for more data.

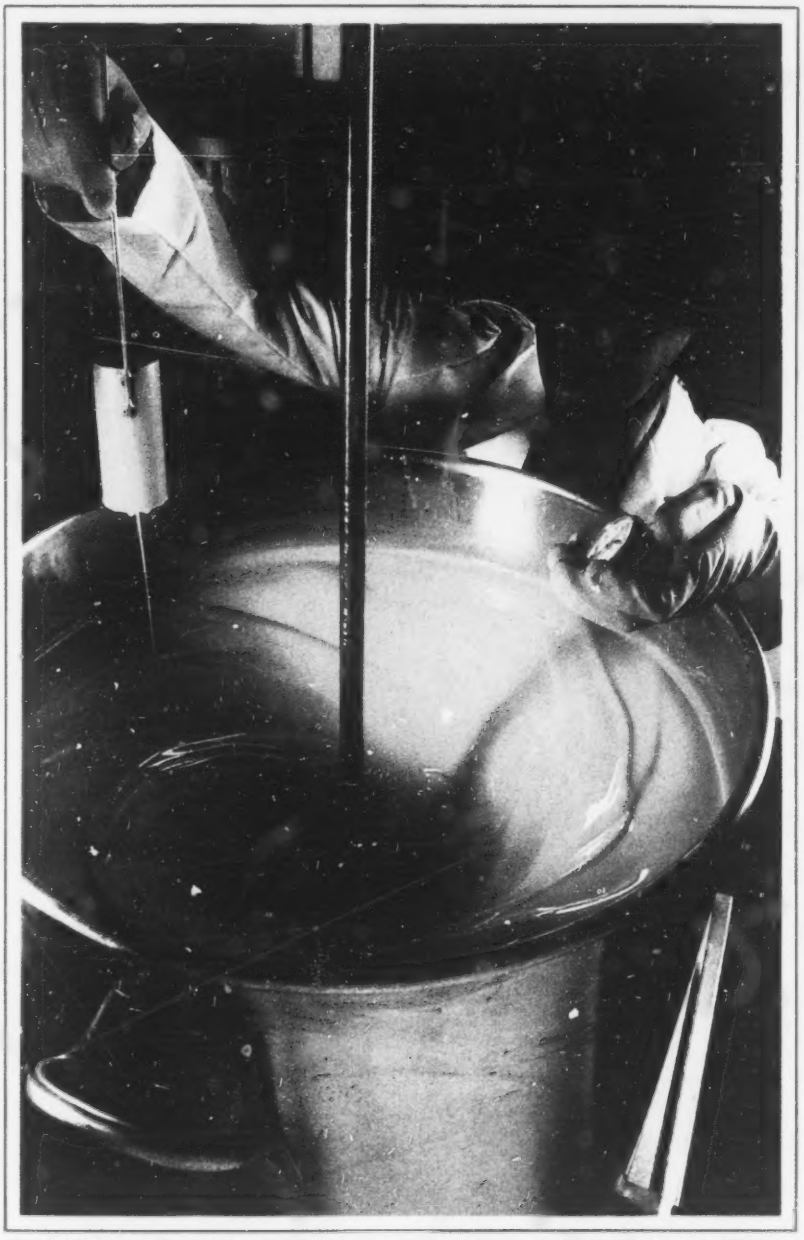
David Webber, New York

Revenues increased 92% in the second quarter

	SECOND-QUARTER 1984[a]						FIRST-HALF 1984[b]					
	Revenues[c] ($ Millions)	Earnings[d] ($ Millions)	Change from 1983 Revenues	Change from 1983 Earnings	Profit margin[e] 1984	Profit margin[e] 1983	Revenues[c] ($ Millions)	Earnings[d] ($ Millions)	Change from 1983 Revenues	Change from 1983 Earnings	Profit margin[e] 1984	Profit margin[e] 1983
Advanced Genetic Sciences	$ 0.0	$−1.9	−92%	def	def	def	$0.1	$−3.5	−92%	def	def	def
Amgen	1.9	−2.1	278	def	def	def	na	na	na	na	na	na
Applied Biosystems	5.9	1.1	125	220%	16.3%	12.8%	10.9	2.0	148	354%	18.6%	10.2%
BioTechnica International	0.4	−1.1	119	def	def	def	0.8	−2.1	252	def	def	def
Biogen	7.8	−4.5	39	def	def	def	13.8	−8.2	43	def	def	def
California Biotechnology	2.1	0.0	67	63	1.9	1.9	4.1	0.1	93	24	3.1	4.8
Centocor	2.7	0.1	69	def	3.8	def	5.2	0.1	81	def	2.1	def
Cetus	13.7	0.2	77	def	1.7	def	25.7	0.3	57	def	1.3	def
Collaborative Research	3.3	−0.8	234	def	def	def	na	na	na	na	na	na
Damon Biotech	1.5	−0.6	162	def	def	def	2.9	−1.2	156	def	def	def
Genentech	17.3	0.6	57	88	3.6	3.0	32.6	1.0	57	80	3.1	2.7
Genex	8.3	−2.0	352	def	def	def	14.2	−3.6	318	def	def	def
Molecular Genetics	2.2	0.0	19	−92	0.9	13.6	4.8	−0.0	60	def	def	4.3
Monoclonal Antibodies	1.0	−0.6	215	def	def	def	1.8	−1.6	225	def	def	def
Ribi ImmunoChem	0.2	−0.1	51	def	def	def	0.5	−0.2	52	def	def	def

a For three-month period ending closest to June 30. b For six-month period ending closest to June 30. c Includes sales, contract research, royalty, and interest revenues. d Excludes extraordinary credits. e After-tax income as a percentage of revenues. na = not available. def = deficit.

Coatings Industry Heading for Record Year



Technician at Du Pont's Troy Laboratory checks viscosity of test batch of paint

David Webber, C&EN New York

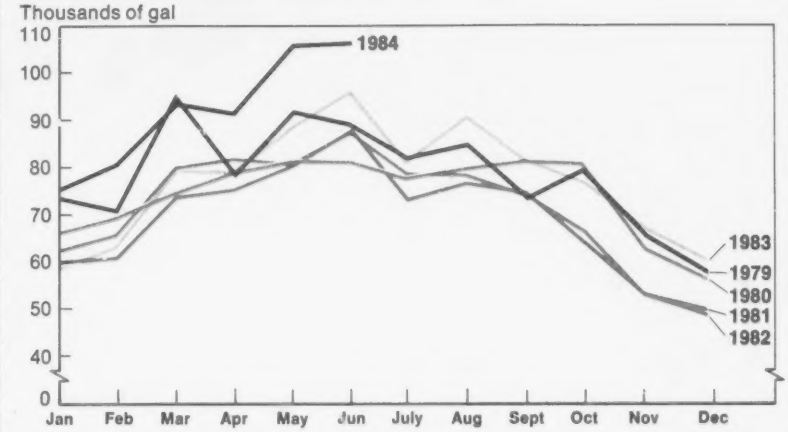
Everyone knows the paint industry is a mature one. So when a largely sedate business—one in which executives talk wistfully about keeping up with the gross national product—acts out of character, positively sprightly, in fact, it makes for a memorable year.

That's the case in the paint industry now. Having last year made up most of the ground lost since the industry peaked in 1979, shipment volume for the total paint and coatings industry continued to surge during the first half of 1984. At midyear, the industry appeared headed for a record performance.

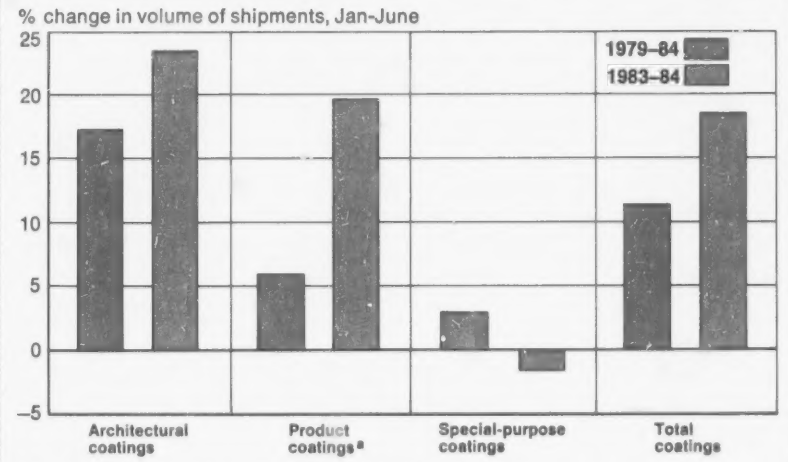
Lifted by the wave of economic expansion in the U.S., coatings shipment volume rose to 523 million gal in the January-to-June period, according to statistics compiled by the Commerce Department's Bureau of the Census, 12.3% above the 466 million gal recorded during the equivalent time period in 1983. That's good growth following a year in which gallonage increased 12.0% from the previous, albeit recession, year.

Even more pleasant to coatings producers and their suppliers, the six-month shipment total was 11% higher than that for the same span in 1979, which so far remains the top year ever in terms of volume. Much can happen in the second half of 1984 to alter this year's record-setting pace, of course, but the second quarter is always the peak three-month period for the seasonal coatings industry, and this year's April, May, and June shipments were well above those for 1979. So even though the economy began to slow down during the third quarter—the Federal Reserve's flash estimate for GNP growth was just 3.6%—it would take an unlikely disruption in the

1984 coatings shipments were exceeding record 1979 pace at midyear . . .



. . . but not all sectors improved equally in first-half 1984 compared to earlier years



[a] Original equipment manufacturers. **Source:** Department of Commerce

marketplace to keep business this year from fulfilling its promise.

There is even humor in the coatings industry this year. Du Pont, in search of a new "paint farm" on which to test the weathering characteristics of its high-performance finishes, recently purchased a nudist camp in Florida. The nudists have been ousted, local environmentalists are worried about the fate of the pine trees on the property (Du Pont says they are safe), and jokes about the acquisition are sure to abound at this year's Federation of Societies for Coatings Technology Paint Show. To head them off, perhaps, a company spokesman notes that, although brochures for the camp have been in evidence at company headquarters in Wilmington, Del., no Du Pont employee actually visited the place while campers were in attendance. He notes, on the other hand, that the purchase should prove the inaccuracy of a recent publication's characterization of the firm as "stodgy."

This rosy picture of the industry needs to be qualified somewhat, of course. First of all, there has long been a good deal of dissatisfaction with the Census Bureau statistics. Reacting to criticism that its method, which uses a sample group of companies and multiplier to come up with volume and value totals, was exaggerating the market, the Census Bureau last year revised its sample in an attempt to reflect actual business activity more accurately.

The effort, though applauded for its intent, has not met with wholesale approval. Analysts of business volume believe the totals are still inflated. At SRI International, for instance, Eleanor M. Connolly estimates that the 12.3% first-half jump reported by the Census Bureau is higher than the real increase. A number of others, from both within and without the coatings industry, agree, guessing that growth in the January-to-June period probably fell instead somewhere in the range of 9 to 11%.

This does not, however, invalidate the trend shown by the government statistics. For one thing, those dissatisfied with the figures say that the totals are probably equally exaggerated in previous years, despite the revisions. And Juliette Benedicto, of the National Paint & Coatings Association's management information office, points out that there is a close trendline correlation between the government's figures and NPCA's internal survey of coatings volume. That survey consists of confidential reports from a group of companies a little more than one fifth the size of the Census Bureau sample. A plotting of percentage changes in the NPCA survey, she says, very closely tracks a similar rendition of the Census statistics.

The other qualification of the industry's overall glossy look is that this year's surge has not swept up all sectors of the coatings business equally. It has been a truly good year in general for makers of architectural coatings—the sector composed mainly of interior and exterior house paints, stains, and varnishes. Volume at midyear was up 24% over the same point in 1983 and up 17% over that for 1979, according to Census Bureau statistics. Also doing very well have been product coatings sold to original equipment manufacturers (OEM). Shipments in this sector, which includes coatings for the automotive, wood furniture and fixtures, metal container, and other industries, were nearly 20% higher than in first-half

1983 and 6.0% higher than in first-half 1979.

Left behind by this wave of success is the special-purpose coatings sector. Because of spotty recovery by some of its major end-use markets, which include automotive refinishing, high-performance maintenance coatings, traffic paint, and others, shipments in the special-purpose sector actually declined 1.5% over the first six months of 1984. They were up just 2.9% from the same period in 1979.

Much of the reason for this pattern of growth and contraction can be seen in the performance of the major markets that consume the bulk of the U.S. paint and coatings industry's products. Residential construction, for instance, is a major influence on sales of house paint, varnish, and stain, of course, as well as on consumption of OEM coatings for factory-finished wood. The growth of the architectural coatings sector over the first half is reflected in the prime barometer, housing starts, which ran at a high annual pace until dropping sharply in August.

Domestic automobile production, obviously the chief influence on sales of OEM automotive finishes, also increased briskly during the first quarter, although it has been tapering off since then, according to the Federal Reserve Board's industrial production index. Another large economic trend that has helped the coatings industry this year has been continued high defense spending by the Reagan Administration—a boon to makers of aircraft and marine finishes as well as to marketers of urethane coating systems, which are being applied to Army vehicles to protect them from chemical weapons. Still another economic boost has come from increasing emphasis on repairing the nation's infrastructure, resulting in higher sales of traffic paints and bridge coatings.

This year's healthy performance so far follows a year of strong recovery from the recession low reached in 1982. Last year, shipments of architectural coatings jumped to 463 million gal, up about 12% from the 1982 total. The value of those shipments rose to $3.84 billion, almost 24% higher than in the previous year. In the product coatings-OEM sector, shipment volume increased to 331 million gal, up 15% from the year before, and value rose to $3.0 billion, 16% higher than in 1982. And in the special-purpose coatings sector, which had been steadier during the recession, shipment volume grew 6.1% compared to 1982, and value shot up 21%.

This kind of overall growth is not expected to continue unabated. The essential maturity of the coatings industry and its close dependence on markets that track the GNP and population growth will keep expansion in check. Business Trend Analysts, Commack, N.Y., for instance, projects compounded annual volume growth for the period between 1982 and 1992 of 1.5% for architectural coatings, 2.5% for product coatings-OEM, and 3.1% for special-purpose coatings. For the composite coatings industry, the forecasting firm predicts average annual growth of 7.0% in value over that same span, but factoring out anticipated inflation, real growth will amount to about 2.0%.

Although expected to grow the most slowly, the architectural coatings sector remains the largest of the three broad coatings markets. In 1983, house paints and the like accounted for some 50% of total coatings shipments of 923 million gal and 45% of a sales total of $8.6 billion. The architectural coatings sector's link to the health of the housing market has brought it success so far this year, and companies say revenues were up well over the first half. But there are negative aspects in both short- and long-term respects that are expected to restrain growth in the future.

Of most concern this year are interest rates, which have been rising most of 1984 as a function of the financial community's fear of the huge federal budget deficit. Mortgage rates have risen in turn, pricing portions of the population out of the housing market. Last week's

Paint and coatings statistics revision

Readers comparing shipments statistics for the 1979–82 period published here with statistics for the same period published last year (C&EN, Oct. 3, 1983, page 25) will notice some large differences. Since January 1983, the Department of Commerce's statistics on coatings shipments have been based on reports from a different group of companies than that used before. Statistics used in graphs, tables, and text of this article for the period before January 1983 have been revised by the Commerce Department for comparability.

Coatings fall into three major end-use groups

Architectural coatings
- Exterior house paints
- Interior house paints
- Undercoaters, primers, and sealers
- Varnishes
- Stains

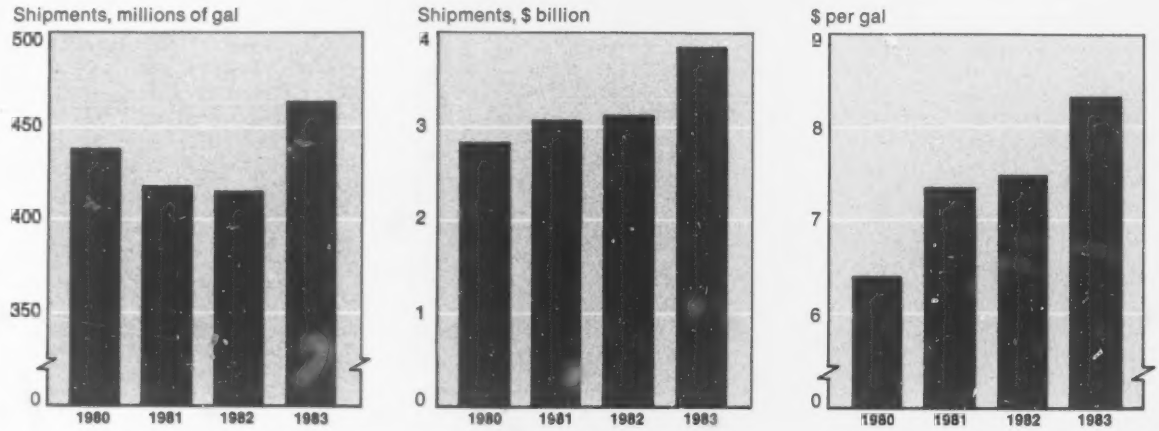
Product coatings-OEM[a]
- Wood furniture and fixtures
- Automotive
- Metal containers
- Machinery and equipment
- Factory-finished wood
- Metal furniture and fixtures
- Sheet, strip, and coil
- Transportation (nonautomotive)
- Appliances
- Electrical insulation
- Marine
- Film, paper, and foil
- Pipe
- Toys and sporting goods
- Miscellaneous consumer and industrial products

Special-purpose coatings
- Automotive and machinery refinishing
- High-performance maintenance
- Traffic paint
- Roof
- Bridge
- Aerosol
- Swimming pool
- Arts and crafts
- Metallic
- Multicolored

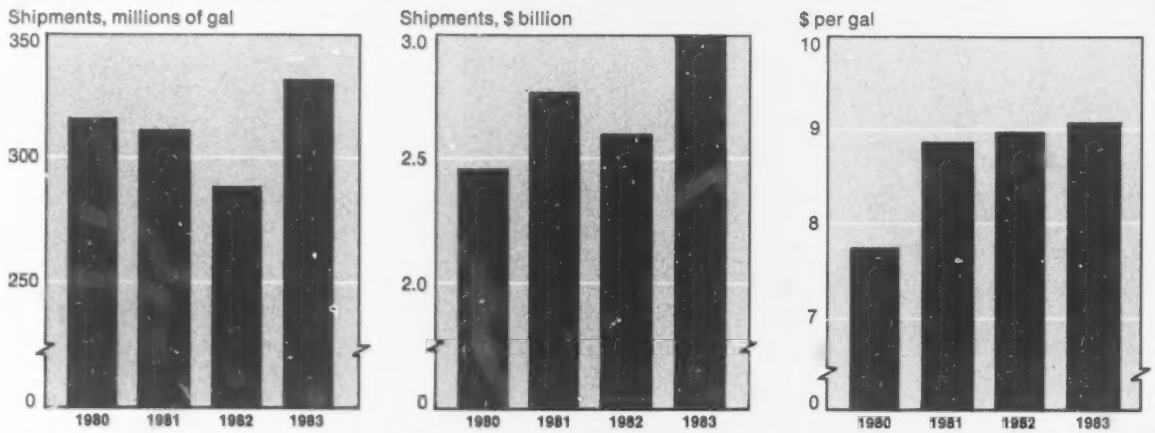
a Original equipment manufacturers. Source: SRI International

Shipments reversed downward trend last year

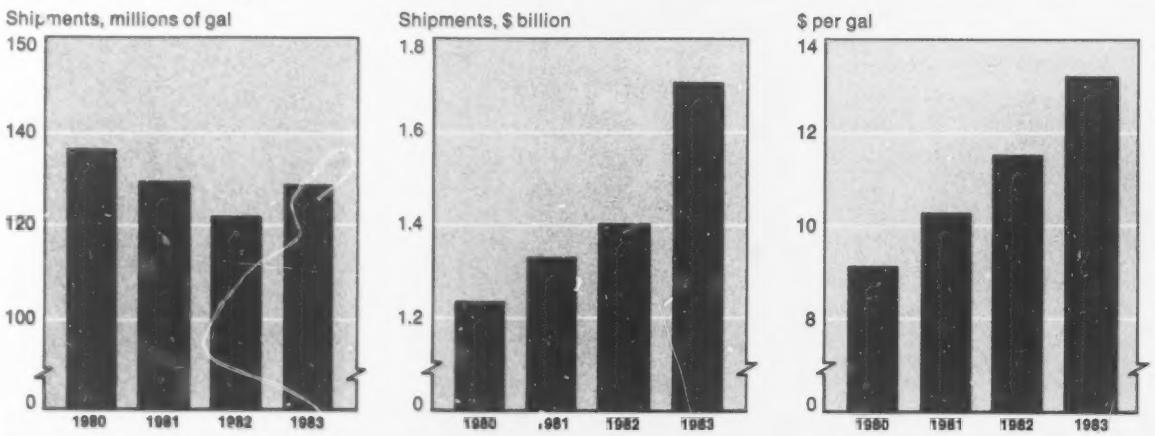
Architectural coatings



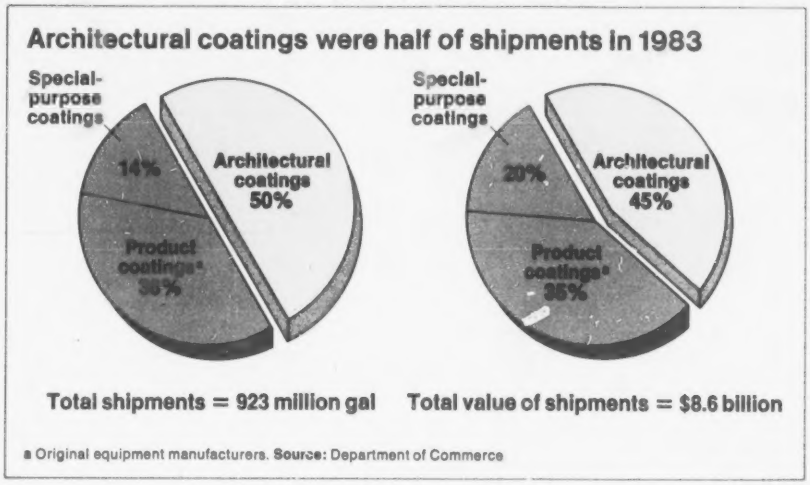
Product coatings[a]



Special-purpose coatings



a Original equipment manufacturers. **Source:** Department of Commerce



0.25% drop in the prime rate is seen as an encouraging sign, but economists are not yet ready to say that the danger of further rate increases is over.

Manufacturers Hanover Trust, for instance, recently argued that "the sharp increases in interest rates that occurred during the first half of this year have again placed home ownership beyond the reach of an ever-growing segment of the general public." The bank's economic bulletin points out that sales of new single-family homes this summer were well below the peak reached last December, leaving builders with more than a half-year's supply of unsold new homes, one of the highest inventory levels in almost two years.

Marine Midland Bank's chief economist, Albert DePrince, likewise notes that though overall housing activity remains strong, single-family home sales are slowing in response to interest rate pressures.

This short-term trend is actually an instance of a longer-term tendency in home construction: the steadily increasing vitality of multiunit residential construction compared to that of traditional single-family dwellings. In 1975, for example, single-unit homes accounted for 77% of all housing starts, compared to just 18% for residential structures

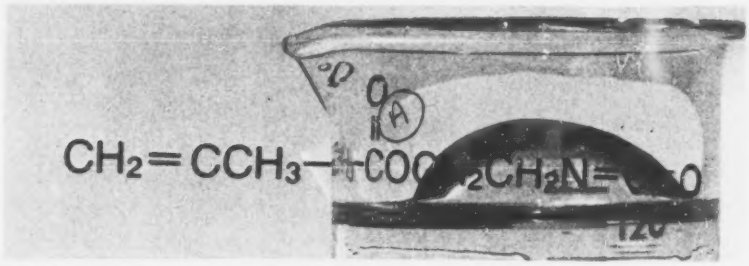
Paint industry's regulatory concerns: seeking consistency

For the U.S. coatings industry, the most significant government action of recent years is still the Environmental Protection Agency's action to reduce emissions of volatile organic compounds. That requirement, which has a 1988 deadline, has hastened, among other things, the automotive industry's shift from lacquer to higher-solids enamel coatings. The industry has other regulatory and legislative concerns, however, which, even if not likely to have so immediate and widespread an impact as the volatile organics ruling has had, are considered key because they could set precedents that industry members see as onerous. What particularly worries the industry is the spread of regulations and ordinances on the state and local levels. Often, industry executives say, these rules are more stringent than the federal version that addresses the same area. And a proliferation of local rulings means a loss of regulatory consistency, a development that can add to cost and confusion for companies manufacturing a coating product in one state and shipping it for use in another, producers say.

The National Paint & Coatings Association (NPCA), the industry's chief trade group, is concentrating its attention now on state and local oversight. "There's nothing we see on the federal regulatory frontier that's particularly threatening," says Bruce Hamill, the association's general counsel. According to him, the key issues now are:

- Hazard communication rule. NPCA is currently engaged in a lawsuit defending the Occupational Safety & Health Administration's position in a case, United Steelworkers of America vs. Auchter, now pending in the U.S. Court of Appeals 3rd Circuit. NPCA is working to defend the idea that the OSHA rule pre-empts local right-to-know requirements.
- Superfund reauthorization. In a case that does involve federal legislation, NPCA is making "a priority use of its resources" to seek what it calls "fair and equitable apportionment" of the cost of cleanup, an issue it considers crucial for the association's many small company members.
- State right-to-know laws. NPCA is seeking consistency among such requirements. "It's not that the individual states' requirements tend to be so burdensome," Hamill says. "It's the diversity that is problematic."
- Leakage from underground storage tanks. "A big, hot issue that's coming along," Hamill says. Currently under consideration in California are requirements for the monitoring of underground storage tanks, a feature of many coatings production facilities, through wells or liners.
- Transportation regulations. In New York City, NPCA is negotiating with municipal authorities for some easing of local regulations governing transportation of a number of coatings raw materials. The ordinances are stricter than federal regulations regarding truck safety specifications and driver certification, according to Hamill. "It's not an industrywide problem," Hamill says. "It's the precedent that bothers us."
- Chronic hazard labeling regulations. Of current concern to NPCA are state efforts to require hazard warnings on containers of art materials. "We see it as setting a pattern for all sorts of labeling regulations," Hamill explains.
- Solvent abuse. "Paint sniffing" by adolescents has led to laws in Texas that require a ban on sales of spray paints to minors. NPCA, which says there has been a "noticeable increase" of such abuse in recent years, is helping put together a public-service group called SAFE (Solvent Abuse Foundation for Education) that will seek to dissuade adolescents.

Clearly...



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with five units or more. Since then, the single-unit percentage has steadily shrunk, while the multiunit percentage has steadily swelled. By 1982, only 62% of all privately owned new housing starts were single-family dwellings; 30% of the starts were structures with five units or more.

This trend is generally considered bad for paint producers, because multiunit residences such as apartment buildings and condominiums are more frequently constructed of brick or stone than are single-family units. That means less paintable surface.

But the amount of paintable surface has been shrinking for more than one reason. For one thing, the average size of new houses has been declining. Reflecting this, according to Business Trend Analysts, the cost of paint per $1000 of construction price in single-family housing dropped from $6.51 in 1969 to $6.10 in 1982, an average annual decrease of 0.5%. Similarly, in multifamily housing, the cost per $1000 of construction price fell from $7.19 in 1969 to $6.78 in 1982, an annual decline of 0.6%.

In addition, paint marketers must continue to fight their ongoing war with wallpaper and paneling for the interior market and with aluminum and vinyl siding for the exterior protection market. Architectural coatings producers are somewhat optimistic on this score; they believe that the pace of penetration of siding has slowed.

"Siding has not had in the last several years as much of an impact. Now it is more of a battle between aluminum and vinyl siding," remarks John S. Dumble, president of the Glidden coatings and resins division of SCM Corp., one of the leading house paint producers along with Sherwin-Williams, PPG Industries, DeSoto, Standard Brands Paint Co., and Clorox. "The effect has been a modest one. Both aluminum and vinyl siding sales represent paintable surfaces that are lost to us, but it has stabilized as far as the architectural market is concerned. Now it is more a shift from aluminum to vinyl than a shift from painting to siding."

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Titanium dioxide: supply tight, prices rising

Between 1973 and 1983, U.S. production of titanium dioxide, the largest-volume pigment used by the coatings industry, remained essentially unchanged. That, the multiple recessions of the past decade, and regulatory pressures were enough to convince a half-dozen producers to quit the business. The last new production facility, built by Du Pont, was completed in 1981, and TiO_2 had all the look of a commodity chemical product well settled into its maturity. As recently as last year, producers were anticipating very little growth in consumption for the rest of the 1980s.

The picture looks somewhat different now. Domestic TiO_2 output, coming off a 14% drop in recession-year 1982, jumped 15% in 1983, and, according to some estimates, could rise another 5.6% this year. The result is tight supply, rumors of allocation, and a hasty scramble to raise some plant capacities by debottlenecking.

"The industry was not prepared for the tremendous surge in demand as the economy recovered worldwide, particularly in those areas that are strong consumption points for titanium dioxide," says Howard England, vice president for manufacturing at Ampacet Corp.

Those areas—paint (which accounts for about half of TiO_2 consumption), paper, and plastics—have done well in the current expansion. Paint shipments jumped 12% last year over the disastrous 1982 performance and, at mid-1984, were running more than 12% above 1983's first-half pace, according to Commerce Department statistics.

In response, domestic TiO_2 producers Du Pont, SCM, American Cyanamid, and Kerr-McGee reportedly have been operating their facilities near or at the limit of their effective capacities. Ampacet's England forecasts U.S. demand of some 880,000 tons this year. He puts effective capacity at 800,000 tons. Net imports will make up the difference.

Looking beyond the U.S., he sees the same tightness of supply now and expects it to persist. According to his calculations, total global demand will amount to 2.45 million tons in 1984. With a total world capacity of just 2.60 million tons, plants will have to operate at 94% of their capacity to satisfy the marketplace's appetite. In 1986, he says, the situation will be little different. Global capacity will have grown to 2.68 million tons, but demand will have risen to 2.52 million tons, keeping the capacity utilization requirement at 94%.

There are a number of debottlenecking projects under way, but, as England points out, no new plants have been announced. "It takes approximately four years from date of announcement to startup to bring a plant on stream," he says. "So this tight supply situation will continue not for several weeks but possibly for several years."

In the meantime, SCM last month spent $110 million to buy LaPorte Industries' TiO_2 business. The acquisition, which includes a plant in the U.K. and one in Australia, adds 110,000 tons a year to SCM's capacity, which was expanded last year by the purchase of Gulf & Western's 35,000-ton Ashtabula, Ohio, unit.

Taking the long view, Alan Ferguson of SRI International sees the potential for tightness in TiO_2-containing minerals supply as well. There was ample supply in 1982, he points out, but besides the shutdown of five mines over the past five years, additional closings are expected before 1987. As a result, additional mineral capacity will be needed, he says. Whether the need is met will depend on whether two expansions of existing mines and one new mine each in Australia, South Africa, and India come on stream as planned between now and 1987.

ness Trend Analysts' recent study of the paint and coatings industry, expenditures by residential property owners for paint rose 2.8% in 1982, whereas spending on siding dropped 5.7%. But the consulting firm considers this an anomaly; over the next decade, it forecasts a decline in total volume of exterior paints because of long-term growth by aluminum and polyvinyl chloride siding.

Glidden's Dumble also points out that the trends in housing starts,

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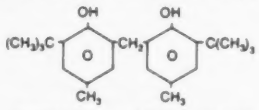

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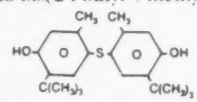

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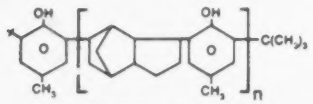

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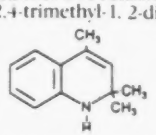

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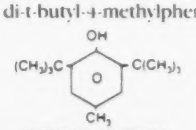

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both long and short term, do not reflect the greatest portion of the business for house paint—the residential resale market.

"Someone who buys an existing house or is getting ready to sell a house tends to be a very heavy user of paint," he says, "and the resale market is significantly larger than what you have with the new housing market." But that business segment also, he notes, is tied to interest rate fluctuations.

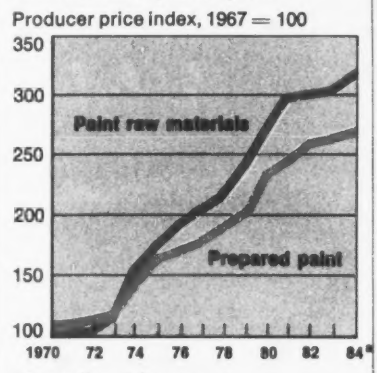
If interest rates do constrain housing activity in the coming months, architectural coatings producers will look to maintenance painting to counter the negative effects on them to some extent. When the economy slows, such demand tends to pick up relative to other house paint sales.

"It is a significant part of our sales," says Dumble. "That kind of usage in the do-it-yourself market will continue as long as housing starts are down and there is not as much resale. People tend to do more in the homes they own. So it compensates to some degree for the dropoff in the other area. I see continued strength in home maintenance painting, simply because in the other area, it continues to be somewhat soft."

Even with this year's good level of volume sales, the most intractable problem for architectural coatings makers is pricing. On the one hand, prices for prepared paint have risen, along with nearly everything else, handily over the past decade. But since 1974, prices of paint raw materials have been rising even faster. Ten years ago, prepared paint cost 1.4 times what it did in 1967; for paint raw materials, the price multiple was 1.5, according to the Department of Labor's producer price index. Now, based on an average of first-half 1984 price indexes, prepared paint costs 2.6 times and paint raw materials 3.2 times what they did in 1967. And this trend is, if anything, accelerating. At midyear the price index for prepared paint had risen just 1.0% from the 1983 average, but the index for paint raw materials had climbed 6.3%.

The result is reduced income for producers of architectural coatings. Lilly Industrial Coatings, for example, in reporting record sales and earnings for its third quarter and nine-month period ending Aug. 31, pointed out that raw material cost increases during the past several months restrained third-quarter profits. "Every paint manufacturer is going through a squeeze right now in being able to recover costs as the raw material prices have gone up," comments Glidden's Dumble.

Raw material prices rising faster than paint prices



a January through June average.
Source: Department of Labor

Partly, he says, the squeeze is a function of what he perceives as paint producers' having less leverage with their raw material suppliers than major paint customers have with paint producers. This has led to the manifestation of the current price squeeze most visible to consumers: discounting.

"The percentage of paint sold on sale has been climbing continuously," Dumble says. "You can't pick up the newspaper without seeing a paint sale ad in there. Unless you're going to let other discounters have the market, you are going to have to have the same kind of posture. I don't see other discounters changing their strategy, and that will continue to have an impact on how other marketers address the marketplace. And that's going to mean discounting."

This long-term price imbalance has elevated distribution to a position of prime importance in the strategies of architectural coatings manufacturers. Companies have augmented their own chains of proprietary paint stores and have concentrated on placing their wares in the

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Beardwood: competitive on enamels

big national home center chains that now command a large share of the do-it-yourself consumer marketplace.

"The most important thing that has benefited our business today and for the past several years is the fact that we identified the home center market early on as a growth opportunity within the retail business," says Glidden's Dumble.

After architectural coatings, the largest sector of the industry is product coatings-OEM, which accounted for 36% of shipment volume and 35% of sales dollars last year. In 1982, according to Business Trend Analysts, the market was divided in terms of volume among automotive finishes, 16%; metal container finishes, 19%; machinery finishes, 6.4%; sheet, strip, and coil coating finishes, 5.8%; metal furniture finishes, 5.4%; and numerous other end-use segments.

The liveliest segment is the automotive, where PPG Industries, Inmont, Du Pont, and a few other suppliers compete for contracts with car makers in Detroit and abroad. Even though the size of the market has declined sharply since the mid-1970s because of Detroit's well-known woes, the companies supplying automotive finishes have been engaged in an expensive, fast-moving technology race that has been spurred by the auto makers' moves toward compliance with the Environmental Protection Agency's limit on emissions of volatile organic compounds of 3.6 lb per car produced (the deadline for compliance is 1988), energy-conservation needs, and desire for increased corrosion resistance.

In the market for automotive topcoats, car makers have been moving away from low-solids lacquers, which have high volatile organic emissions, to higher-solids enamels. The trend has resulted in an R&D competition to develop high-solids finishes that, while helping bring down emissions levels, also flow well enough to meet assembly-line production requirements. This technical shift has coincided with a general move by car makers to a base coat/clear coat approach to topcoats—a system that permits very high solids content as well as what the automotive industry likes to call "enhanced aesthetics." PPG and Inmont took the early lead in the high-solids technical race; Du Pont, which considers itself the leader in topcoats, continued to supply lacquer products to General Motors, its major customer.

GM's decision to move to enamels as well, however, spurred Du Pont to pick up the pace of its high-solids research. The company, which last year sold its architectural paint business to Clorox in order to concentrate on automotive and other high-performance coatings, now believes it has caught up. After losing four major GM paint contracts in a row to competitors, it has won the last three.

Bruce A. Beardwood, vice president in Du Pont's finishes and fabricated products department, points out that each of the seven recent GM awards were made on increasingly higher solids standards. "If anything, it got tougher, not easier, to be competitive as that scenario developed," he says. "We feel we're fully competitive now on the enamel systems."

Du Pont concedes, on the other hand, that PPG remains the clear leader in the automotive primer segment. That has really been the case since PPG introduced cathodic electrodeposition of primer coats. Now PPG has introduced Uni-Prime, a refined electrocoating sys-

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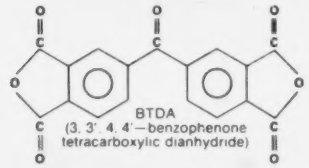

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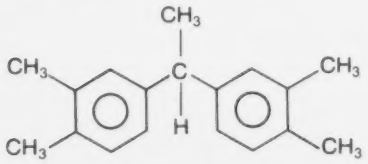

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Worker examines weathering characteristics of test paint panels at Du Pont's Hialeah, Fla., "paint farm" weathering station

tem that the company says eliminates the need for the second, sprayed-on primer coating that most car makers still use. Inmont is also a major player in the primer business, and Du Pont is trying to catch up to PPG via a joint technology development program with Hoechst, which competes in Europe with PPG.

"We're working to develop an alternative technology," Beardwood explains. "Our objective is to become a full-line supplier here in the U.S."

Du Pont, along with others, also has stepped up its research in the automotive aftermarket segment. The technical developments of the OEM market, Beardwood notes, create consequent new product development needs in the aftermarket. Unlike OEM finishes, he points out, aftermarket finishes are air-dried. "So while the finish has to look the same on the car, these are different chemistries," he says. "We've got to respond to what's going on in the OEM."

Automotive refinishing paints, primers, and lacquers accounted for 29% of the special-purpose coatings sector in 1982, according to Business Trend Analysts. The other major segment, high-performance maintenance paints, accounted for 31% of shipment volume, traffic paints 14%, and marine, aerosol, and other specialty coatings the remainder.

In 1983, special-purpose finishes accounted for 14% of total coatings volume and 20% of overall value, according to Census Bureau statistics. Because of their specialty applications, marketers of these products have, in general, managed to raise prices where those in the architectural and, to an extent, OEM sectors have failed. But shipment volume for the sector as a whole has faltered this year.

According to SRI's Connolly, the weak link is probably the maintenance segment, which she says is generally split about equally between coatings to maintain existing chemical, paper, and textile plants and oil refineries and those applied to new facilities. Because new construction of such units is down, this coatings segment has suffered.

Still, specialty coatings are expected to be the fastest growing of the three major coatings sectors, and companies are responding with increased activity. Du Pont, for instance, has been marketing a maintenance coatings and service package for chemical and oil installations. And Mobay Chemical, which produces urethane systems for high-performance coatings formulation, has been vigorously promoting expanded use of its products in coatings for transportation vehicles, industrial facilities, bridges, roofing, and other sectors. Last month, the company announced it was building a plant to produce an improved aliphatic polyisocyanate with high weatherability and chemical resistance properties. □